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AN ILLUSTRATED MONTHLY MAGAZINE Devoted to the Interests of Teachers of Geography in Elementary, Secondary and Normal Schools

Edited and Published by

RICHARD ELWOOD DODGE

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THE JOURNAL OF GEOGRAPHY

VOL. V DECEMBER, 1906 NO. 10

THE CHARACTERISTICS OF THE ZONES: III.—THE POLAR ZONES[1]

By ROBERT DEC. WARD,
Harvard University

[1]See this *Journal*, pp. 302-319, 337-353, for Parts I and II. In addition to authorities previously cited, reference has been made to the meteorological results obtained by the recent Arctic and Antarctic expeditions in the *Fram*, *Gauss*, *Discovery*, *Scotia*, *Belgica*, *Southern Cross*, etc.

The following charts will prove of value to those who wish to make a more detailed study of the meteorology of the polar regions: Monthly north polar isobars, isotherms and isanomalies; mean annual isotherms and isanomalies; annual migration of isotherms, Pls. XI—XX, *The Norwegian North Polar Expedition, 1893-1896, Scientific Results edited by Fridtjof Nansen*. Vol. VI. Meteorology. By H. Mohn, 1905. Text, pp. 570-576.

Monthly north polar isotherms, isobars and winds. *Report on Atmospheric Circulation*, By A. Buchan. "Challenger" Expedition, London, 1889.

North polar isotherms, isobars and winds for alternate months; mean annual isotherms and isobars based on simultaneous observations made at noon, G. M. T. Bartholomew's *Atlas of Meteorology*, Pls. 1, 4, 11, 13. Text, pp. 7, 10, 13, 14-15.

Annual storm tracks and frequency, based on International Meteorological Observations, *ibid*, Pl. 28. Text p. 27.

Mean annual isotherms for south polar area (1902-3), and world chart of mean annual isotherms extended to include latitudes 60°-80° S. "Kaltepole und Eistriften der Antarktis in den Jahren 1902 bis 1903." By W. Krebs. *Das Weltall*, IV, 1904, 442-444.

Mean winter and mean summer isotherms for south polar area. "La Température des Pôles." By C. Passerat. *Annales de Geographie*, XIII, July 15, 1904, pp. 289-295.

The charts of isotherms, isobars and winds around the south pole in February (largely hypothetical), after Dr. Buchan and Sir John Murray, published in 1898 (*Scot. Geogr. Mag.*) are also interesting.

Synopsis

General: Relation to man, animals and plants.—Temperature.—Pressure and winds.—Rain and snow.—Humidity, cloudiness and fog.—Cyclones and weather.—Twilight and optical phenomena.—Physiological effects.

General: relation to man, animals and plants. The temperate zones merge into the polar zones at the Arctic and Antarctic circles or, if temperature is used as the basis of classification, at the isotherms of 50° for the warmest month, as suggested by Supan. The frequent use of maps on the Mercator projection tends to give us an exaggerated idea of the size

of the polar zones. When limited by the polar circles, these zones occupy but 0.08 of the surface of each hemisphere, the whole area being 1.00. Astronomically they are distinguished by the fact that at all places within them the sun is above the horizon at least one full twenty-four hours, and below it the same length of time. This longer or shorter absence of the sun gives the climate a peculiar character, not found elsewhere. At the poles, the day and the year are alike. These zones obviously have the most oblique insolation.

For but a very small part of the polar zones have we any knowledge, by observation, of the *climate*. The fragmentary records of the earlier expeditions gave scattering information about the weather. The longer and more complete records of recent expeditions give much more accurate and satisfactory results. It is now becoming possible to see more clearly what the climatic conditions really are. But as yet no scientific presentation of polar climatology is possible. We are still dealing with the meteorology of the polar zones, rather than with their climates. More is known of the Arctic than of the Antarctic. From the latter there are already several excellent contributions, but up to this time no record both as long and as complete as that of the Nansen Expedition has been obtained. The admirable report, by Dr. Mohn, on the results of this expedition, embracing three years' observations, discussed with great care, and well illustrated by curves and charts, is a monumental piece of work. Under the able directorship of Mr. Walter G. Davis, however, the Argentine Meteorological Service is steadily accumulating observations at its far southern stations, on the South Orkney and South Shetland Islands, and although these stations are not within the Antarctic zone, they will furnish valuable information concerning the great ocean area surrounding this zone.

Beyond the isotherm of 50° for the warmest month, forest trees and cereals do not grow. In the northern hemisphere this line is well north of the Arctic circle in the continental climate of Asia, and north of it in northwestern North America. It is north of it also in northern Scandinavia, but falls well south in eastern British America, Labrador and Greenland, and also in the North Pacific Ocean. In the southern hemisphere this isotherm crosses the southern extremity of South America, and uns nearly east and west around the globe. The conditions of life are necessarily very specialized under the peculiar climatic features which are met with in these zones. There is a minimum of life, but more in the north polar than the south polar zone, and our knowledge is confined chiefly to the former area. Plants are few and lowly. Land animals

which depend upon plant food must therefore likewise be few in number. Farming and cattle-raising cease. The reindeer, which manages to find sufficient food in the lowly Arctic vegetation, is the mainstay of many of the Arctic natives. But the reindeer must wander far and wide in search of their moss. And many reindeer are needed to provide sustenance for one man. Population is small and scattered. There are no permanent settlements at all within the Antarctic circle. Life is hard; a constant struggle for existence. Man seeks his food by the chase on land, but chiefly in the sea. It has been well said that with every degree of higher latitude, man is more forced to obtain his food supply from the sea. He lives along, or near, the sea coast. The interior lands, away from the sea, are deserted. Gales, and snow, and cold cause many deaths on land, and also, especially during fishing expeditions, at sea. It has been estimated that about one-twenty-fifth of the population of Iceland perishes through being lost in snowstorms; by freezing; or by drowning. Under such hard conditions of securing food, famine is a likely occurrence. The polar limit of permanent human settlements is believed by Bessels to be fixed, not by the decreasing temperature, but by the increase in the length of the night, which shortens the time during which man can lay up food by hunting and fishing.

In the Arctic climate, vegetation must make rapid growth in the short, cool summer. In the highest latitudes, the summer temperatures are not high enough to melt snow on a level. Exposure is therefore of the greatest importance. Arctic plants grow and blossom with great rapidity and luxuriance where the exposure is favorable, and where the water from the melting snow can run off. The soil then dries quickly, and can be effectively warmed. On the other hand, when the water stands, it may freeze again and again, and the soil underneath has no opportunity to warm. Of Nova Zembla, Baer has reported that the level surfaces are polar deserts, while the slopes at the foot of the mountains, unless covered with boulders, are like gardens in summer. Protection against cold winds is another important factor in the growth of this vegetation. Over great stretches of the northern plains the surface only is thawed out in the warmer months, and swamps, mosses and lichens are found above eternally frozen ground. Trees often grow in favorable conditions along streams when the intervening plains are typical tundras. Direct insolation is very effective in high latitudes. Where the exposure is favorable, snow melts in the sun even when the temperature of the air in the shade is far below freezing. It has been reported that at Assistance Bay (lat. 74½° N.)

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in March, when the air temperature was about —25°, snow near stones and other dark objects melted in the sun. Even the mean daily temperature of the snow surface may be higher than the air temperature. The injurious effect of polar climate upon vegetation, especially upon trees, has been attributed by Kihlmann to an insufficient water-supply furnished by the roots deep in the cold ground. From the upper parts of the tree, exposed to sunshine and wind, evaporation proceeds rapidly, and the tree

January

FIG. 1.
January North Polar Isotherms.

dries up. Protective devices against excessive evaporation, not unlike those of desert plants, are found.

Arctic and Antarctic zones differ a good deal in the distribution and arrangement of land and water around and in them. The southern zone is surrounded by a wide belt of open sea; the northern, by land areas. The northern is therefore much affected by the conditions of adjacent continental masses. Nevertheless, the general characteristics are apparently much the same over both, so far as is now known, the Antarctic differing from the Arctic chiefly in having colder summers and in the regularity of its pressure and winds. The cold Antarctic summers are the

chief cause of the poverty of the Antarctic flora. Both zones have the lowest mean annual temperatures in their respective hemispheres, and hence may properly be called the *cold zones*. The designation *cold* is distinctly preferable to *frigid*, but *polar* is to be preferred to either.

Temperature. At the solstices, the two poles receive the largest amounts of insolation which any part of the earth's surface ever receives. It would seem, therefore, that the polar temperatures should then be the

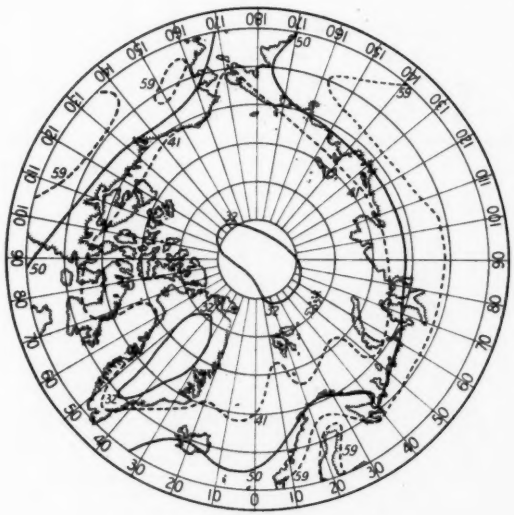

FIG. 2.
July North Polar Isotherms.

highest in the world, but as a matter of fact they are nearly or quite the lowest. Temperatures do not follow insolation in this case because much of the latter never reaches the earth's surface; because most of the energy which does reach the surface is expended in melting the snow and ice of the polar areas; and also because the water areas are large, and the duration of insolation is short. Hence the mean annual temperatures at both poles are nearly, or quite, the lowest in the world.

A set of monthly isothermal charts of the north polar area, based on all available observations, was prepared by Mohn and published in the

volume on Meteorology of the Nansen Expedition. These charts give the most authentic information now at hand regarding Arctic temperatures. In the winter months there are three cold poles, in Siberia, in Greenland and at the pole itself. In January, the mean temperatures at these three cold poles are —49°, —40° and —40° respectively.

The Siberian cold pole becomes a maximum of temperature during the summer, but the Greenland and polar minima remain throughout the year. In April the lowest isotherm, —22°, is in Greenland, the North Pole is then within the area enclosed by —18.4°. In July the temperature distribution shows considerable uniformity: the gradients are relatively weak.

A large area in the interior of Greenland, and one of about equal extent around the pole, are within the isotherm of 32°. Hence the statement frequently made that no places in the northern hemisphere have mean temperatures below freezing in July is not correct. In October the interior of Greenland is enclosed by —13°, and at the pole we find —11.2°. For the year

FIG. 3.
Mean Annual North Polar Isotherms.

a large area around the pole is enclosed by the isotherm of —4°, with an isotherm of the same value in the interior of Greenland, but a local area of —7.6° is noted in Greenland, and one of —11.2° is centered at lat. 80°N. and long. 170°E. It will be seen that the temperatures are relatively lower towards the eastern sides of the great continents. The ordinary mean annual isothermal chart shows, within the Arctic circle, temperatures of 40° off the Norwegian coast and —5° beyond lat. 75°N. north of Asia and North America. The January chart shows 30° off the Norwegian coast, and —60° at Verkhoyansk, in Siberia. The July chart shows 60° over the continents to 40° in extreme northeastern Asia.

The north polar chart of annual range of temperature shows a maximum range of about 120° in Siberia; of 80° in North America; of 75.6° at the North Pole, and of 72° in Greenland. The North Pole obviously has a continental climate. The minimum ranges are on the Atlantic and Pacific Oceans. The mean annual isanomalies show that the line of zero anomaly passes through the pole (as it must do). The interior of Greenland has a negative anomaly in all months. The Norwegian sea area is 45° too warm in January and February. Siberia has +10.8° in summer, and —45° in January. Between Bering Strait and the pole there is a negative anomaly in all months. The influence of the Gulf Stream drift is clearly seen on this chart, as it is also on that of mean annual ranges.

The mean temperatures of the higher northern latitudes in January, July and for the year, have been determined by Mohn with the following result:

Mean Temperatures of the Higher Northern Latitudes.

	60°	65°	70°	75°	80°	85°
Jan.	+3.0°	—9.4°	—15.3°	—20.2°	—26.0°	—36.6°
July	57.4	54.3	45.1	38.1	35.6	32.5
Year	30.0	21.6	12.7	5.5	—0.6	—6.2

For the North Pole itself, Mohn gives the following results, obtained by graphic methods:

Mean Temperatures at the North Pole.

Jan.	Feb.	Mar.	Apr.	May	June	July
—41.8°	—41.8°	—31.0°	—18.4°	8.6°	28.4°	30.2°
Aug.	**Sept.**	**Oct.**	**Nov.**	**Dec.**		**Year**
26.6°	8.6°	—11.2°	—27.4°	—36.4°		—8.9°

It appears that the region about the North Pole is the coldest place in the Northern hemisphere for the mean of the year, and that the interior ice desert of Greenland, together with the inner polar area, are together the coldest parts of the northern hemisphere in July. In January, how-

ever, Verkhoyansk, in northeastern Siberia, just within the Arctic Circle, has a mean temperature of about —60°, while the inner polar area and the northern interior of Greenland have only —40°. Future exploration in the immediate vicinity of the North Pole may show a lower January mean temperature there than at present appears. Such exploration will, moreover, certainly necessitate readjustment of the isothermal lines as now drawn for this polar area. It may be noted that the isotherm of 32° in January crosses the Arctic Circle in the northeastern Atlantic. Elsewhere it is south of this line. By December all land within the Arctic Circle is below the freezing point. Thus far no minima as low as those of northeastern Siberia have been recorded in the Arctic, and the Arctic maxima are much lower.

For the Antarctic our knowledge is still very fragmentary, and relates chiefly to the summer months, but the numerous well-equipped expeditions of the last ten years have brought back very valuable results, extending in a few cases over all parts of the year. On the February South Polar isothermal chart published in 1898 (after Buchan) the isotherm of 30° was shown essentially coincident with the Antarctic circle, while a part of the isotherm of 25° was drawn inside of the circle. Using the newest data available, Hann has determined the mean temperatures of the higher southern latitudes as follows:[1]

Mean Temperatures of High Southern Latitudes.

S. Lat.	50°	60°	70°	80°
Mean Annual	41.9°	28.4°	11.3°	—3.6°
January	46.9	37.8	30.6	20.3
July	37.2	18.3	—8.0	—24.7

These temperatures can be compared with those given on page 439, for northern latitudes. From lat. 70°S. polewards, Hann finds that the southern hemisphere is colder than the northern. Antarctic summers are decidedly cold. The mean temperature of the warmest month over the whole Antarctic zone is below the freezing point,[2] while within the Arctic Circle mean temperatures above 32° are generally found, except in the interior of Greenland and around the pole. These low temperatures of the south polar summer, which are probably due to the great continental mass of ice around the South Pole, are responsible for much of the difficulty and disagreeable quality of Antarctic exploration. They prevent much melting of snow and ice, and are monotonous and depressing. The mean an-

[1] *Nature*, Jan. 5, 1905, p. 221.

[2] At Cape Adare, a mean January temperature of slightly over 32° was obtained on one expedition, under abnormally favorable conditions.

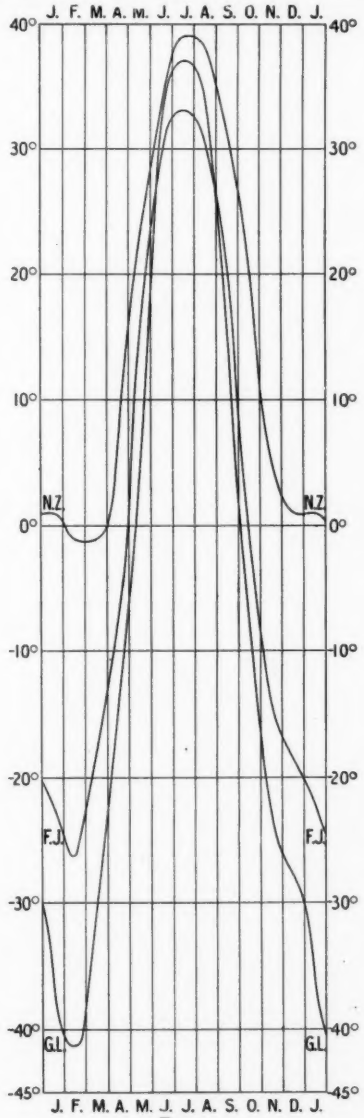

FIG. 4

Annual March of Temperature: Polar Type.

N. Z.—Nova Zembla; F.J.—Franz Joseph's Land; G.L.—Grinnell Land.

nual temperatures experienced have been in the vicinity of 10°, and the minima of an ordinary Antarctic winter go down to —40° and below, but so far no minima of the severest Siberian intensity have yet been noted. The British expedition on the *Discovery,* recorded —67.7° at Cape Armitage at noon, May 16, 1903. The maxima have varied between about 35° and 50°.

The temperatures at the South Pole itself furnish an interesting subject for speculation. It is likely that near the South Pole will prove to be the coldest point on the earth's surface for the year, as the distribution of insolation would imply, and as the conditions of land and ice and snow there would suggest. There is, however, room for doubt whether the lowest mean annual temperature will be at the mathematical pole. It is almost certain that the lowest winter and summer temperatures in the southern hemisphere will be found in the immediate vicinity of the pole. One attempt to draw isotherms for the Antarctic zone, on the basis of the recent data, is that of Passerat,[1] who has charted the mean winter and mean summer temperatures. Obviously these charts are based on extremely incomplete data, and can only be regarded at best as tentative in the highest degree. On the mean winter chart, the isotherm of —4° (—20°C.) is mostly within the Antarctic Circle, and in places well within it, while —13° (—25°C.) appears between lats. 70° and 80° on Graham Land and Victoria Land. On the mean summer chart the isotherm of 32° (0°C.) is about half within and half without the Antarctic Circle, and partly within lat. 70°. The isotherm of 23° (—5°C.) appears on Victoria Land, between lats. 70° and 80°. Krebs has attempted to draw isotherms for the far southern latitudes, using the data collected during the years 1901-1904. The isotherms on the mean annual isothermal chart of the world given in Hann's *Lehrbuch der Meteorologie* have been extended to include latitudes up to 80° S. The lowest temperature shown is indicated by portions of the isotherm of —4° at about latitude 80° S.

It must not be supposed that the isotherms in the Antarctic region run parallel with the latitude lines. They bend polewards and equatorwards at different meridians, although much less than in the Arctic.

The annual march of temperature in the north polar zone, for which we have the best comparable data, is peculiar in having a much-retarded minimum, in February or even in March—the result of the long, cold winter. The temperature rises rapidly towards summer, and reaches a

[1] See reference above. Note also reference to *Scot. Geogr. Mag.*, 1898.

maximum in July. Autumn is warmer than spring. Winter comes on gradually, the summer slowly "falling asleep." The polar type of annual march of temperature is illustrated in the accompanying curves: (See Fig. 4.)

The continents do not penetrate far enough into the Arctic zone to develop a pure continental climate in the highest latitudes. Verkhoyansk, in lat. 67°6′ N., almost on the Arctic Circle, furnishes an excellent example of an exaggerated continental type for the margin of the zone, with an annual range of 120°. One-third as large a range is found on Nova Zembla. The diurnal period of temperature is noted during the time when the sun is visible, but is hardly, or not at all, perceptible during the dark season. During the latter, according to the *Fram* observations, the day hours are usually colder than the night hours. This appears to be an effect of winds, for colder, northerly winds prevailed during the hours of daytime, and milder, southerly winds by night. Polar climate as a whole has large annual and small diurnal ranges, but sudden changes of wind may cause marked irregular temperature changes within twenty-four hours, especially in winter. The small ranges are associated with greater cloudiness, and *vice versa.* The mean diurnal variability is very small in summer, and reaches its maximum in winter, about 7° in February, according to Mohn.

Pressure and Winds. Owing to the more symmetrical distribution of land and water in the southern than in the northern polar area, the pressures and winds have a simpler arrangement in the former, and may be first considered. Recent Antarctic exploration has considerably modified some of the views which have been held regarding the general winds of the south polar area, and their controlling pressures. The rapid southward decrease of pressure, which is so marked a feature of the higher latitudes of the southern hemisphere on the isobaric charts of the world, does not continue all the way to the south pole. Nor do the prevailing westerly winds, constituting the "circumpolar whirl," which are so well developed over the southern portions of the southern hemisphere oceans, blow all the way home to the south pole. The steep poleward pressure gradients of these southern oceans end in a trough of low pressure, girdling the earth at about the Antarctic Circle. From here the pressure increases again towards the south pole, where a permanent inner polar anticyclonic area is found, with outflowing winds deflected by the earth's rotation into easterly and southeasterly directions. A chart of the South Polar isobars for February (after Sir John Murray and Dr. Buchan), published in

1898, showed a pressure of 29.00 inches in the low pressure girdle, and the isobar of 29.50 inches around the inner polar area. These easterly winds have been observed by the recent expeditions which have penetrated far enough south to cross the low pressure trough. The limits between the prevailing westerlies and the outflowing winds from the pole ("easterlies") vary with the longitude and migrate with the seasons. The change in passing from one wind system to the other is easily observed. The *Belgica,* for example, in lats. 69½°-71½°S., and longs. 81°-95°W., was carried towards the west by the easterly winds in summer, and in winter was driven east by the westerlies, and then again to the west. The *Belgica* thus lay in winter on the equatorial and in summer on the polar side of the trough of low pressure. On the other hand, the English expedition at lat. 77° 50′S., was persistently on the polar side of the trough, with dominant S. S.E. and E. winds. The smoke from Mt. Erebus, however, showed prevailing southwesterly currents. The German expedition on the *Gauss* was also under the régime of the easterly winds during its stay in winter quarters. The *Belgica* had fewer calms than some stations nearer the pole. This south polar anticyclone, with its surrounding low pressure girdle, migrates with the season, the centre apparently shifting polewards in summer and towards the eastern hemisphere in winter. The outflowing winds from the polar anticyclones sweep down across the inland ice and are usually cold. Under certain topographic conditions, descending across mountain ranges, as in the case of the Admiralty Range in Victoria Land, these winds may develop high velocity and take on typical foehn characteristics, raising the temperature to an unusually high degree. From the fact that certain warm southerly winds have been reported from the mountainous eastern coast of Victoria Land, as being damp and snow-laden, Sir Clements Markham has suggested that they come from an open ocean to the south, beyond the south pole. Foehn winds have been noted in the South Orkneys, from W.N.W. They are also known on both coasts of Greenland, when a passing cyclonic depression draws the air down from the icy interior. These Greenland foehn winds are important climatic elements, for they blow down warm and dry, raising the temperature even 30° or 40° above the winter mean, and melting the snow.

In the Arctic area the wind systems are less clearly defined and the pressure distribution is much less regular, on account of the irregular distribution of land and water. The isobaric charts published in the report of the Nansen Expedition show that the North Atlantic low pressure area is more or less well developed in all months. Except in June, when it lies

over southern Greenland, this tongue-shaped trough of low pressure lies in Davis Strait, to the southwest or west of Iceland, and over the Norwegian Sea. In winter it greatly extends its limits farther east into the inner Arctic Ocean, to the north of Russia and Siberia. Between May and August it is much less well developed. The Pacific minimum of pressure is found south of Bering Strait and in Alaska. Between these two regions of lower pressure, the divide extends from North America to eastern Siberia. This divide has been called by Supan the *"Arktische Windscheide."* High pressures are found in North America and in Siberia from September to March, the maxima being in Asia. The belt of somewhat lower pressure connecting these two maxima is situated between Bering Strait and the North Pole. In July and August the maximum pressure is between Greenland and somewhat east of Spitzbergen. The pressure gradients are steepest in winter. At the pole itself pressure seems to be highest (about 30.079 ins.) in April and lowest (29.882 ins.) from June to September. The annual range is therefore only about 0.20 in.

The prevailing westerlies, which in the high southern latitudes are so symmetrically developed, are interfered with to such an extent by the varying pressure controls over the northern continents and oceans in summer and winter that they are often hardly recognizable on the wind maps. The isobaric and wind charts prepared by Buchan show that on the whole the winds blow out from the inner polar basin, especially in winter and spring.

In the European and North American polar areas the annual march of pressure gives a spring maximum, in April and May, and a minimum in January or February. The daily fluctuations in pressure in these circumpolar latitudes are about twice as large in winter as in summer.

Rain and Snow. Rainfall on the whole decreases steadily from equator to poles. The amount of precipitation must of necessity be comparatively slight in the polar zones (15-10 ins., and less), chiefly because of the small capacity of the air for water vapor at the low temperatures there prevailing; partly also because of the decrease, or absence, of local convectional storms and thunder showers.[1] Even cyclonic storms cannot yield much precipitation. The polar zones therefore have a permanent deficiency of precipitation. Their deserts of snow and ice are climatic deserts in more senses than one. These extended snow and ice fields naturally tend to give an exaggerated idea of the actual amount of precipitation.

[1] Locally, under exceptional conditions, as in the case of the western coast of Norway, the rainfall is a good deal heavier.

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It must be remembered, however, that evaporation is slow at low temperatures, and melting is not excessive. Hence the polar store of fallen snow is well preserved: interior snow fields, ice sheets, and glaciers are produced. Nansen is of the opinion that the amount of condensed vapor, much of it being in the form of "frozen fog" (hoarfrost) and not readily measurable, exceeds evaporation in the polar districts.

The commonest form of precipitation is naturally snow, the summer limit of which, in the northern hemisphere, is near the Arctic Circle, with the exception of Norway. In lat. 70°N., at Boothia Felix, 40 per cent. of the precipitation from June to August comes in the form of snow. So far as exploration has yet gone into the highest latitudes, rain falls in summer, and it is doubtful whether there are places near sea level where *all* the precipitation falls as snow. It is also uncertain whether any mountains reach a height where nothing but snow falls. Von Drygalski believes that the inland ice cap of Greenland, over 2600 feet above sea level, meets these conditions. The snow of the polar regions is characteristically fine and dry. Schwatka has pointed out that the snow huts of the Eskimos could not be built with the kind of snow that falls in the United States. At low polar temperatures *flakes* of snow are not found, but precipitation is in the form of ice spicules. The finest glittering ice needles ("diamond dust") often fill the air, even on clear days and in calm weather, and gradually descending to the surface, slowly add to the depth of snow on the ground. Dry snow is also blown up from the snowfields on windy days, interfering with the transparency of the air. Snowfalls at temperatures of —40° and even below have been reported from eastern Siberian and Arctic stations. It is probable that under these conditions the air is warmer aloft.

Humidity, cloudiness, and fog. The absolute humidity must be low in polar latitudes, especially in winter, on account of the low temperatures. Relative humidity varies greatly, and very low readings have often been recorded. Cloudiness seems to decrease somewhat towards the inner polar areas, after passing the belt of high cloudiness in the higher latitudes of the temperate zones (see Table, p. 342). In the marine climates of high latitudes, the summer, which is the calmest season, has the maximum cloudiness; the winter, with more active wind movement, is clearer. The data and curve given below illustrate these conditions. The summer maximum is largely due to fogs, which are produced where warm damp air is chilled by coming in contact with ice. They are also formed over open waters, as among the Faeroe Islands, for example, and open water spaces, in the midst of an ice-covered sea, are commonly detected at a dis-

tance by means of the "steam fog" which rises from them. Fogs are uncommon in winter, when they occur as radiation fogs, of no great thickness.

Annual March of Cloudiness in Polar Latitudes. Marine Type.

(Seven stations. Lat. 70°N.)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
7.1	6.9	6.4	7.0	7.7	8.3	8.5	8.2	8.0	8.0	6.8	6.6	7.5

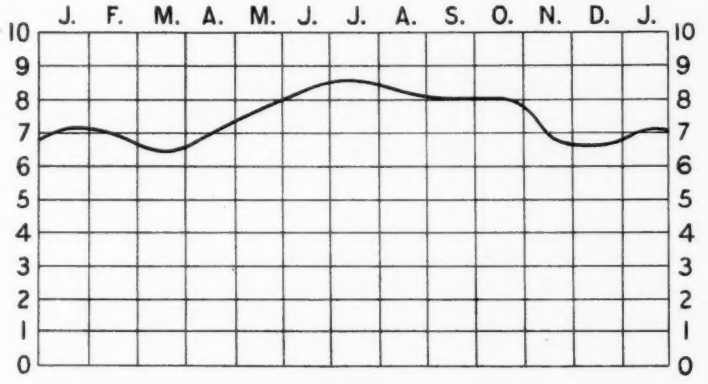

FIG. 5

Annual March of Cloudiness in Polar Latitudes. Marine Type.

The small winter cloudiness, which is reported also from the Antarctic zone, corresponds with the low absolute humidity and small precipitation. The coasts and islands bathed by the warm waters of the Gulf Stream drift usually have a higher cloudiness in winter than in summer. The place of fog is in winter taken by the fine snow crystals, which often darken the air like fog where strong winds raise the dry snow from the surfaces on which it is lying.

As yet there is little detailed information concerning the cloud forms and movements in the polar zones, and the reports are rather confusing. The records of the Nansen Expedition show a greater cloudiness by day, and with stronger winds. Cumulus forms are rare, even in summer, and it is doubtful whether the cloud occurs at all in its typical development. Clearly defined cloud forms have been reported by some observers to be very rare indeed in the Arctic, espcially in the winter sky. On the other hand, Lieutenant Royds, of the *Discovery*, reports that he never saw such striking and beautiful examples of every kind of cloud as within the Antarctic circle. At Griffith Island, in the North Polar zone, two months

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passed without clouds. And "day after day, with glorious clear skies and continuous sunshine" is reported by the *Discovery* in the Antarctic. Stratus is probably the commonest cloud of high latitudes, often covering the sky for days without a break. In place of well-developed cloud forms, the air is filled with fog in summer, which often grows into poorly defined stratus clouds. Cirrus cloud forms probably decrease polewards. At the South Orkneys, cirrus was observed at altitudes of 6000 to 8000 feet. Nansen's results give an average cloud movement from W.N.W. and N.W. In the Antarctic, Nordenskjöld reports cirrus from W. to W.S.W.

Cyclones and weather. The prevailing westerlies continue up into the margins of the polar zones. Many of their cyclonic storms—the weather controls of temperate latitudes—also continue on to the polar zones, giving sudden, and irregular pressure and weather changes. The inner polar areas seem to be beyond the reach of frequent and violent cyclonic disturbance. Calms are more common; the weather is quieter and fairer; precipitation is less. Most of the observations thus far obtained from the Antarctic come from this marginal zone of great cyclonic activity, violent winds, and wet, disagreeable, inhospitable weather, and therefore do not show the features of the actual south polar climate.

The most thorough study of cyclonic movements in the highest latitudes is that in connection with the Nansen Expedition in the *Fram*. During the three years of her drift, depressions passed on all sides of her, with a preponderance on the west. The direction of progression averaged nearly due east, and the hourly velocity twenty-seven to thirty-four miles, which is about that in the United States. The rainy winds were usually S. and S.E., while N.E. and N.W. were least likely to bring rain or snow. For the higher latitudes, most of the cyclones must pass by on the equatorial side of the observer, giving "backing" winds in the northern hemisphere. The main cyclonic tracks are such that the wind characteristically backs in Iceland, and still more so in Jan Mayen and on the eastern coast of Greenland these districts lying on the north and west of the path of progression. Frightful winter storms occasionally occur along the east coast of Greenland and off Spitzbergen. During the drift of the *Fram* the southerly winds were the warmest in winter and the northerly the coldest, showing that at the 82nd parallel of latitude the Siberian cold pole ceases to have much influence.

For much of the year in the polar zones the diurnal control is weak or absent. The successive spells of stormy, or of fine weather are wholly cyclonically controlled. Extraordinary records of storm and gale have

been brought back from the far south and the far north. The Swedish Antarctic Expedition, for example, under Nordenskjöld, in 1902-03, experienced for five months, beginning in May, a period of storms with short intermissions never exceeding three days, and during all of this period the average wind velocity was twenty-three miles an hour, and for a fortnight it average forty-five miles. The *Discovery* reported a gale on July 19, 1902, which lasted ten hours with a velocity of eighty-five miles an hour. Wind direction and temperature vary in relation to the position of the cyclone. During the long dreary winter night the temperature falls to very low readings. Snowstorms and gales alternate at irregular short intervals with calmer spells, of more extreme cold and clearer skies. The periods of greatest cold in winter are calm. A wind from any direction will bring a rise in temperature, This probably results from the fact that the cold is the result of local radiation, and a wind interferes with these conditions by importing higher temperatures, or by mixing upper and lower strata. During a northern polar winter the average thickness of ice formed over the oceans where no storms or strong tides interfere reaches six feet and more. Nansen found a thickness of over eight feet in one year. During the long summer days the temperature rises well above the winter mean, and under favorable conditions certain phenomena, such as the diurnal variation in wind velocity for example, give evidence of the diurnal control. But the irregular cyclonic weather changes continue, in a modified form. There is no really warm season. Snow still falls frequently. The summer is essentially only a modified winter, from the point of view of temperate zone man, especially in the Antarctic, where accounts of low temperatures, high winds, frequent fogs and much cloud, do not give a very cheerful picture of weather conditions. In summer, clear spells are relatively warm, and winds bring lower temperatures. In spite of its lack of high temperatures, the northern polar summer, near the margins of the zone, has many attractive qualities in its clean, pure, crisp, dry air, free from dust and impurities; its strong insolation; its slight precipitation. In certain places as on the interior fjords of Greenland and on the tundras of Asia and North America, the summer brings swarms of gnats and flies, which are an extreme annoyance, and the prevalent summer fogs are a serious disadvantage.

Twilight and optical phenomena. The monotony and darkness of the polar night is decreased a good deal by the long twilight, due to the high degree of refraction at low temperatures. The sun actually appears and disappears some days before and after the times which are geometrically

set. Light from moon and stars, and from the aurora, also relieves the darkness. Optical phenomena of great variety, beauty and complexity are common. Solar and lunar haloes, and coronae, and mock suns and moons are often seen. Auroras seem to be less common and less brilliant in the Antarctic than in the Arctic. Sunset and sunrise colors within the polar zones are described as being extraordinarily brilliant and impressive.

Physiological effects. The north polar summer, as has been pointed out, in spite of its drawbacks, is in some respects a pleasant and healthful season. But the polar night is monotonous; depressing; repelling. Parry said that it would be difficult to conceive of two things which are more alike than two polar winters. An everlastingly uniform snow covering; rigidity; lifelessness; silence—except for the howl of the gale or the cracking of the ice. Small wonder that man feels like an intruder. Small wonder that the polar night has sometimes unbalanced men's minds. The first effects are often a strong desire for sleep, and indifference. Later effects have been sleeplessness and nervousness, tending in extreme cases to insanity; anaemia; digestive troubles. Extraordinarily low winter temperatures are easily borne if the air be dry and still. Nansen notes "not very cold" at a temperature of —22°, when the air was still. Another Arctic explorer, at —9°, says "it is too warm to skate." Zero weather seems pleasantly refreshing if clear and calm. But high relative humidity and wind—even a light breeze—give the same degree of cold a penetrating feeling of chill which may be unbearable. Thus the damper air of spring and summer usually seems much colder than the drier air of winter, although the temperatures may be the same. Large temperature ranges are endured without danger in the polar winter when the air is dry. When exposed to direct insolation the skin burns and blisters; the lips swell and crack. Thirst has been much complained of by polar explorers, and is surely due to the active evaporation from the warm body into the dry, relatively cold air. There is no doubt that polar air is singularly free from micro-organisms—a fact which is due chiefly to lack of communication with other parts of the world. Hence diseases which are common in temperate zones, "colds" among them, are rare.

NEWSPAPER LETTERS FROM THE FORBIDDEN BALKANS

By FELIX J. KOCH
Cincinnati, Ohio

III.—A PEEP AT THE ALBANIANS, THE BLOOD-DRINKERS OF EUROPE. THE MACEDONIAN QUESTION

UNLESS you are willing to drink the blood of a haughty tribal chieftain of the particular country side mapped out on your itinerary, do not visit this wildly romantic region, Albania. Wilder than Macedonia, where one is ever fearing assassination, more dangerous than southern Bulgaria, in whose defiles even my guards would never be willing to vouch that we would not be kidnapped, are the fastnesses of Albania, the home of the blood-drinkers of Europe.

On September 3, 1905, it was rumored that a serious fight had occurred in the harem, or woman's apartment, of the Yildiz Kiosk, the imperial palace at Constantinople, between the Bosniac and Albanian guards, and the rumor even went so far as to state that the occasion was made one for an Albanese to shoot at the Sultan, whose life was saved only by the coat of mail perpetually worn by Abdul Hamid, the Timorous.

Persons acquainted with conditions in the Ottoman empire to-day see the fairy tale involved in this story at once. Of all the people of the Moslem world none are half so faithful to the defender of the faith, none such ardent bigots to the word of the caliph as the Albanese, and it is told the traveler everywhere in the south of Europe that if worst come to worst Abdul Hamid could take refuge in Albania and hold out against the world. Last summer an attempt at Italian influence in Albania was the gossip of the European chancellories, but nothing came of it, and for good reason. Christian powers need no more hope to gain lasting foothold in the mountains of Albania than they might in the Cannibal Islands, and if the conquest were one of brute force it could not be lasting.

When the writer planned a tour into Albania it was to have embraced the Sea of Scutari. So far, so good. To go further, however, meant becoming involved in the most repellant custom ever met with in Europe. In the Canelesser-Tahl you have to drink hospitality with the pleasant hosts, all from one and the same tiny glass, and in Turkey one is frequently compelled to share the luncheon of some filthy Spanish Jew, but here in Albania you drink blood with your host and in this wise:

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You meet on the neutral boundary line, host and you. He is in the milky-white suit of an Albanian lord, the tall white fez throwing in relief the long hair straggling at each side the brow, and the fierce fiery eyes that pierce one's soul with their luster. No pity, no sympathy, nothing but greed and fiery hate and bigotry can one read in those flashing pupils. The host takes his knife from the belt and cuts a gash in his left hand, somewhere on the back. As the blood trickles, he lets it flow into one of the small Albanian drinking cups, bought at Cattaro or in Montenegro from the traders. Then you too, must do the same, and to the mixed bloods in the cup wine from the village casks is added. He takes a gulp, you take a gulp, and you are sworn blood brothers, and you are safe anywhere in the bounds of his clan.

Time and again, from the railway trains in the Balkans, an Albanian will be seen to dart and throw his arms about some other white-clad Albanese in most affectionate greeting.

"That is my brother," he will explain, and the meaning is involved in the blood brotherhood. Unless one drink the blood he may bind the Albanian with the most solemn oath before taking him as guide, at a fabulous sum, and then once the notion enters his head he may deliberately shoot you down on some lone trail in the mountains—for if the Moslem deem the occasion good he has no hesitancy in breaking any oath made with the infidel.

Another custom laid to the door of the Albanian is that which had practice among the early Goths and Vandals, in the time when Europe was young, as regards the children. When a babe is born in Albania, it is claimed, the father exercises the right to judge if it shall live or die, and as of the selected exposure and hardship weed out the majority, there seems but little likelihood of Albania becoming over-populated.

Some forgotten wave of emigration in the centuries past marooned a little band of Albanese on the Dalamatian coast, near the city of Zara, and in the time when Volker Vanderungen were the order of the day, and the coast of the Adriatic swarmed with pirates, these folk withdrew a little ways into the interior, where their town of Erizzio is now built. Bit by bit civilization found its way down among the Dalmatian archipelagos and to Zara, where the maraschino trade has brought wealth and opulence. But the Albanese only indirectly profited by this, and as the Filipino for years had the Spaniard before him as example, so here the Albanian, profiting, however, by a milder rule, has wrought his destiny and not wholly without success.

It goes without saying that these Albanians are of the Roman Catholic sect; splendid types of manhood; tall, erect, haughty as an Iroquois, and, above all, trustworthy. They are the brethren of the Albanian, who has allied against his kin and the Turk, with the legions of Montenegro, and on whom the Sultan is reported to have called for defense against the Moslem Albanian. Along the Montenegrin border, an officer at Cetigne tells me, frays between these two sects, developing into feuds of interminable length, are the order of the day, and the very slightest error in judgment on the part of the border patrol may result in a dozen deaths:.

Spotless white flannel, short trousers reaching to the knees, short cut coat open in the front and the tall fez, as with the Moslem, is the regulation attire of the Christian Albanian, save where the civilization has spoiled him. Under the open coat a shirt is seen and in bold relief against the white, the broad leather belt of bullets—not ornamental, as is the rule of the Montenegrin, but long, brass-capped missiles—ever ready to do deadly work. Couple this with the long, rounded face, the high neck and the broad chest of the Albanian, and you have a living impersonation of unknown latent strength.

Such statistics as are available make the guess—for, obviously no census of these regions has been attempted—that there are probably 120,000 of these idle, war-loving, haughty barbarians in the Albanian Balkans, and with the overflow in Montenegro and a portion of Bosnia the number is said to be about equally divided as between Mohammedan and Christian. Chiefs, whose allegiance to Constantinople is religious rather than temporal, govern, or try to control, the tribes, but from the Bocohe de Cattaro to Arta, and from the Adriatic almost to Sofia, the reign of law is unknown. Dalmatia, Montenegro, Bosnia, Servia and the geographical expression "Macedonia," even Greece, have suffered periodically from their depredations, and even Turkey, the home of the clans, has not been wholly unsullied by their crimes.

Authorities set the coast line of Albania as having a length of 280 miles, but not an acre of the 18,944 square miles of Albania proper is over 100 miles from the sea, and in all the towns on the west coast of the Nearer Levant one meets the Albanian women selling melons or the tiny egg plant and evoking the pity of the passer-by by their sad, haggard looks. Like the Indian woman at the summer resorts in Michigan or Maine, these women live largely off the stranger for what little pleasure they may obtain in life, and the home is a prison and a place of mere hardship for them. And yet, while the women do the work almost exclusively in Al-

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bania, they have one liberty most unusual for Mohammedan realms, and that is that they go about unveiled and free of lace, where a Turk would slay his wife on the spot were he to find her without deepest lace-covering. If you would see these faces, worn and haggard, you may do so in safety at Cetigne; if you would see them made more beautiful by peace and plenty, it is possible at one's ease at Erizzio.

A delightful country road leads from Zara and the sea to Erizzio. On one hand is the blue Adriatic, with the white island of Uljan, and beyond the peaks from whose crests the Italian coast may be seen on the horizon. On the other, dry thistle fields stretch off to low rolling hills; there is a Champs de Mars for the Austrian troops and a hospital, and one is in Erizzio.

Donkeys are everywhere, weighed down with panniers, and $8 will purchase the sturdiest of these animals. Goats, too, are being driven down the street by the village herder, for you are back in the middle ages here, and all the town has but one lass to tend its flock of sheep or goats. Over at the seaside are the swine, rooting among the rocks, and the little lad who tends them is in communal service, too.

This road to Erizzio and "the simple life" is the one street of the town, and little one-story homes, the most of them no larger than the summer cottages at Asbury, but all built of rock covered with a crude plaster that is painted in white or brown, flank it at either side. Doors and windows grace the front wall alone, so far as one may detect, and narrow red roofs slope gently down to throw their shadow 'cross the door. From the front and rear of the home a great stone wall, bedaubed with mud, leads off to enclose, irregularly, the garden plot—and such is Erizzio, architectually.

One yard here, the other there; a wall touching its neighbor at a half dozen points, another not at any, but permitting of a sort of neutral strip between "my neighbor's garden." It is a hodge-podge of homes and walls that is more devious than old Boston, and more fascinating than the byways of Salem. The gardens, too, are just sufficiently neglected to be picturesque—a few olive or fig trees, a cabbage patch with some Albanian Mrs. Wiggs weeding it, corn and some dry, parched grass—that is all.

The arbor is the centre of the family life in Dalmatian Albania as in the Balkan uplands. Built out from the house, rectangular and enticing of warm summer afternoons, there is this area of shade at the door of each Albanian homestead. Here sit the family, but clad, at Erizzio, in the costume of the Zara peasant—only to be distinguished from that race, in fact, by fairer complexion and the fiery eye.

Families are large in the land of the civilized Albanian, and the father is autocrat to the day of his death. Austrian law limits the exercise of his power, legally, for a son or daughter may appeal to the courts, but this is done very rarely. Hence, by forcing the abolition of the cruel side of the patriarchal system, and yet permitting the Albanese to retain their ancient rites, the Austrians have won the sympathy of the clan leaders and the Albanese are loyal subjects of Franz Josef. Little by little, as the advantages of civilization become overwhelmingly patent to them, they are taking the custom of the Zarites for their own and the wild Albanian or Erizzio is long a thing of the past. The long musket of the youth of the race is still retained, however, but it is now over the fireplace as in Puritan New England, gathering dust through disuse.

The Albanian of Austria has learned, too, to extend hospitality and kindliness to the stranger, and the clan line up for the kodak quite cheerfully at the patriarch's command. The leaders, too, take one through their little home, proudly displaying the blue dishes that stand behind the racks on the wall—as in the heart of distant Holland—let you finger the musket and admire the well-chased revolver, and then set a chair for you to take place at the round table.

He is proud of the baby, too, a wee little fellow in typical French swaddlings—for leader and clan, even to the third generation, reside in the one "long house." When, then, the householders line up at the trees by the road (a favorite place in Erizzio as it is in Indiana) for the village women to idle, the number is strikingly large. The chieftain in my photograph, Lord Bortol Kerstitch, is aged 72, and his rule is extended over a mother, aged 97, four sons and ten grandchildren, while the daughters are counted with the allied clans, into which they may have wed.

With all the attempt at taking on civilization, the Albanian, like our Indian again, cannot "out of the flesh what's bred in the bone." There is a certain air of primitive negligence evident everywhere at Erizzio. The rock stables at the roadside, joined to the homes by walls encircling the garden plot, are dirty and indicative of careless housekeeping. The goats that chance to be home from the fields ramble hither and thither at will, and the rock walls that divide the meadows, as they would in New England, are built after a plan dictated by fancy alone. Only the tall, sweet-smelling hay cocks behind the barn are trim and really orderly, their symmetry throwing into coarser relief the planless fig and mulberry groves beyond.

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At Erizzio the most of the people are farmers. They own their land, and some have become almost rich, as riches go in Dalmatia, hiring other peasants from the coast cities to work their fields at as high as 32 cents a day. Roman Catholicism has taken a great hold on the place, and a pretty stone chapel is built near the sea. Close beside the church is the graveyard, and here, too, two poles, crossed crudely to form the crucifix, but bent and twisted everywhere by the cruel winds of the sea, proclaim the faith of the dead. Some of the wealthy families of late years have taken to erecting tombs, with a tablet of stone and a cross above at the head. Against these stones a large glass case, circular in form, is laid, and inside these a broad, beaded wreath, such as is common in the south of Europe, and two photographs of the deceased are placed. In an old cemetery near Cincinnati a like perpetuation of the photograph of the deceased may be found by the curious. Rows of arbor vitaes leading to the surrounding wall and the sea make picturesque this ancient burial ground.

In the grog shop at Erizzio of a Sunday one may study the "refined" Albanese. On that day the men drop even Dalmatian costumery, and in conventional white shirt and ordinary trousers and vest, with the straw hat of Europe upon their heads, they sit on the upturned casks and drink the red wine of Dalmatia from the yellow earthen pitchers. Taverns over Dalmatia are dark affairs; lit, in fact, by the narrow doorway alone, and one helps himself from the faucet. Then, when one is ready to leave, the innkeeper relies on one's honesty almost exclusively for the amount drawn, and you pay at the rate of less than a nickel per liter.

After the drinking bout the men take to the road, and under a spreading mulberry tree gamble for hours at lotto, marking the numbers with pebbles off the king's highway. One card, too, will suffice for a crowd, who bet which numbers or which row of numbers on the same may chance to be covered first.

So pass hours not spent at work in the fields among the Albanese of Erizzio, and so they do in the mountains of Albania. Only there the hunt and brigandage, which is a legalized profession in that land, supplant the work in the fields by the men, and the target is more favored than the lotto. Folk are not of the choicest in these lands and one lives as best he may among them.

Will a Crusade Solve The Macedonian Question?

One of the most audacious plans for solving the eternal Macedonian question which is again with us because of rumors of another uprising is that proposed by a Greek pope whom I met on the road to this little isolated

Bulgarian hamlet on the very frontier of civilization. The scheme is nothing more or less than the preaching of a crusade against the Moslem by the Greek church in the Balkans. Absolutely preposterous as this at first seems, the more one thinks over the matter the more and more feasible does it become.

In the first place, the head of the Greek church, *per se,* in Europe, the patriarch of Constantinople, is not the tool of the Sultan in the sense in which we are commonly led to believe. On the contrary, I am told that the patriarch hates Abdul Hamid with most deadly hatred, and not without cause. When the primate will not accede directly to the wishes of his imperial majesty, Abdul Hamid has a pleasant way of locking the spiritual prince up in his palace for a week or so and making things decidedly unpleasant. Consequently, it would not make much difference to the patriarch if the good battle were fought if he only dared preach the crusade.

The question then arises, dare he? At least one half of the population of the Turkish empire is made of non-Moslems. The majority of this remainder are of the Greek church. They obviously would fall in line and adopt the cross in the battle. Next in point of numbers, or possibly even more numerous than the Greeks, are the Bulgarians. Remember this does not in any sense mean citizens of Bulgaria but members of the Bulgar church. Almost the only difference between them and the Greeks is the fact that the former owe allegiance to the exarch at Sofia instead of to Constantinople, and that there are a few tiny outer differences in clerical matters. As these people are blood brothers of the Macedonians and as they would undoubtedly find here the long desired goal, they would certainly forget little differences of creed for the time being and join in the holy war.

Ask any Spanish Jew of the Ottoman empire what he has suffered from the Turks and you will be convinced that these people would lend their financial and spiritual, if not active and open, support to the cause.

And so on with the other polyglot that exists in Macedonia.

Now as to surrounding nations.

Russia finds in the overthrow of Turkey the long coveted opportunity to advance to the Golden Horn, especially as the czar, as protector of the Greek church in the east would find himself guilty of inconsistency if he dared so to do. Bulgaria is of the Bulgar church. Servia, with its Serb church, is a daughter of the metropolitan, and such of the Roumanian peasants as do not belong to the Roman Catholic church are also in the

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eastern fold. Hence from all these lands, palmers might be drawn for the expulsion of the hated Turk from Europe.

Would the people come?

Any one who has been in the Balkans knows that they would. I venture to say that were one of the black robed popes so common over the peninsula to stand in his pulpit some Sabbath morning and then and there exhort his congregation to take up the good cause, before nightfall every man and every boy able to bear a musket would be enrolled.

We in America have no conception of priest power as it exists in the Balkans. The village curate is to the people infallible. The "papa," the father, is more than spiritual minister to them, he is the guide and guardian in every walk of life.

Out on the porticoes of the churches are painted grim scenes of tortures in the life beyond.

I recall particularly one cycle of these in a little church here in Bulgaria where the men and women and children are buried in pits much resembling the tops of the coke ovens of Pennsylvania, with their heads just emerging from the "cover," while smoke and flame dart out on every side. Over the top of this supposedly red-hot pit a giant 'gator is sauntering, and now and then as he is especially attracted by some luscious mortal, he complacently bites off its head as does the crocodile in the "Punch and Judy" shows of our fair rings to one or other of the heroes of the pantomime.

In other pictures legions of devils with diabolical grins are seizing the condemned by the nose, with pincers or without, and there are a hundred similar methods of torture to be studied if one so desires.

To the people these images are not symbolical; they are facts and the "little papa" as he is called, it is felt can inflict such pain hereafter upon all.

As the village priest walks down the street, folk come up to kiss his hand or invoke his blessing; every one stands in awe of him, his word is beyond dispute.

Should this man give the promise of remission of all sins of the past to those engaging in crusades, as was done in the days of Coeur de Lion, it is safe to say every one would go forth, as did even the children of Europe in the early thirteenth century.

And what could such a legion accomplish?

Certainly much!

Engulfed by these folk at home, forced to resist the legions from abroad, Abdul Hamid would probably be forced at last to raise the green flag.

That is if the Sheik ul Islam, the head of the church, permitted.

Intelligent Turks, in answer to my query why this banner has not been raised long ago, hint that the green flag of the prophet, at whose call every Moslem in the world must come to the relief of the caliph, can only be raised when there seems chance of success in the combat. This chance Abdul Hamid would hardly have.

In fact, the probabilities are that instead of aiding him, the Sheik ul Islam, who is really master of the Sultan, since he can proclaim the monarch an unfit head of the church, would simply exhort the people not to obey, and then declare the throne and divan vacant.

Abdul Hamid is too easy going to bring on such an issue.

Many say he is not aware of what is going on in his empire and that such a revolution would come as an entire surprise to him. The charge however is false. Even were the Sultan's system of espionage not as complete as it is, the ambassadors who meet the defender of the faith in direct audience have time and again informed him of the state of affairs.

The truth is, he doesn't care.

"Apres moi deluge" is the motto to-day in Turkey.

As to keeping the throne for his heirs he seems not really bothered over that. In fact nine Turks out of ten do not know just who the next Sultan will be. The heir apparent is always the oldest male relation of the Sultan, and not necessarily the oldest son, and it is told that more than once the prince apparent has been very nearly poisoned at the instigation of his royal father to keep him from plotting.

Misrule in Turkey is not confined to Macedonia. It is ubiquitous. Then why attempt a reform?

The system as it is, is completely satisfactory to the Sultan.

The valis, or province governors, buy up the districts at so much a year. If the money isn't sent they receive the bow string. How these obtain it he doesn't care. If they oppress the Christian subjects it doesn't greatly matter. If they oppress the Moslems they will have to send him additional presents to square matters or he will quietly sell their position to some other office seeker and either put them out of the way or degrade them.

Everybody is living off graft and everybody expects to be bled. So the people arrange their affairs in accordance, and nobody is much the worse for it. Nobody, that is, except the infidels, and they, of course, are not to be considered.

And now the worm is turning in Macedonia. In the spring time there is to be a renewal of hostilities. If then the holy war is proclaimed all

the world will look on with interest; a crusade in the twentieth century to rescue not the Holy Land, but to make the Moslem relinquish the battle ground of cross and crescent of two centuries and more—there is a fund of suggestions for the romancer in this idea.

Who will lead it?

Possibly from some upland village will come another humble pope, another Father Gapon, at the head of his people.

In the little hermitages that abound in southern Bulgaria the anchorites have their secrets.

Even in the great monasteries, such as Rila, where a thousand refugees are taken in each winter and fed and housed until the snows melt on the Macedonian side of the border, there are arsenals.

And no war is so terrible as a war for the faith. If it comes the land will be drenched with blood.

But only such a bath of gore seems the final solution of the Macedonian question. The reforms of to-day have failed and the Christians are up in arms.

A METHOD OF MAKING A TOPOGRAPHIC MAP

By F. V. EMERSON
Columbia, Mo.

A MAP is a kind of written language by which an immense amount of information may be conveyed in a brief space and, like any other language, maps must be thoroughly understood before their facts can be well appreciated. Owing to our training which begins in

FIG. 1

Topography from County Caernarvon in North Western Wales; Bangor sheet No. 106, ordinance survey of England and Wales. Scale 1 inch=1 mile. Both hachures and contours are used, the contour interval being 250 feet.

the lower school grades, most of us read the ordinary location maps with ease. We get a more or less accurate idea of the two principal things that they show, namely, distance and direction.

For a complete picture of a region, the third dimension must be shown. One must know the hills and valleys, the highlands and lowlands and their various forms and dimensions, or, in another word, the *relief* of a region. The maps that show relief are of two general classes, hachure maps and

contour maps. The maps of most European countries are of the first class, Fig. 1. They are easy to read and give a vivid impression of the surface. They are really generalized drawings. The disadvantage of the hachure map is that it is of necessity inaccurate. Even the most careful shading will fail to bring out the details of elevation that can be shown on contour maps, and, when the relief is of great variety, the shading obscures the place names and makes close reading somewhat difficult. But, for the general reader, the hachure map gives a general view of relief without much mental effort.

The maps of the United States Geological Survey, in which it is proposed eventually to present the entire United States, are of the contour variety. Relief is represented by lines that are drawn through places having the same altitude. The function of a contour line may be illustrated by supposing the sea to rise to an altitude of say six hundred feet. Then the six hundred-foot line would be coincident with the shore line. The advantage of this method is the possibility of extreme accuracy. By careful work, the exact altitude of any place can be shown. In general, the contours do not obscure the printing and other features of the map. It should be said that owing to the large areas covered, the average topographic map of the Survey is not so accurate as it seems to be. The great disadvantage of this map is the difficulty that the average person has in reading it. Its symbols are purely conventional and do not appeal to the eye as do the hachure maps. It takes considerable time to learn the alphabet of these maps, and generally a longer time so to master them that one does not need to spell out their meaning.

The ability to interpret contour maps may be gained by studying the maps themselves, by comparing the maps with the surface mapped, or by mapping a given surface. All these methods are useful, but the last is perhaps least used. The writer's experience in summer school work goes to show that time spent in actual mapping of some surface is profitable and is one of the quickest and most satisfactory methods of learning the contour map language.

While it is true that rapid, accurate contour mapping requires trained men, almost anyone can by care make an accurate contour map. The method to be explained may perhaps be best presented by glancing at the methods of a professional topographer. All field mapping is done on a "plane table." This is simply a flat top set on tripod so that it can be turned in any direction. In one side of the table a compass needle is sunk, so that the table may be set in a north south direction. The paper on which the

map is to be drawn is fastened to the table. The north part of the map can then be placed at the top of the sheet according to the usual convention.

A base line is measured, say 100 feet long. The measuring is done as carefully as possible, because a good many determinations will be taken from this line without direct measurement. The base line is represented

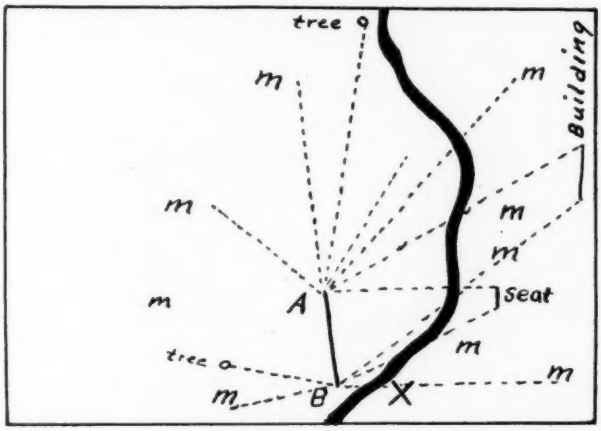

FIG. 2

Sketch showing locations. The building and seat in the eastern half of the map were located by intersection; the other points were located by traverses.

on the map by a line say 10 centimeters long. At each end of the base line observations are taken on various objects, and their angles with the base line are found. These angles are then plotted on the map and the relative positions of the various objects are determined. For example, if A, B, Fig. 2, represents the base line, by plotting angles at A and B and continuing their sides until they intersect, the position of the rustic seat can be determined. This is the method of intersection. By continuing the process a large number of places can be located often from one base line.

If for any reason the intersection method is not used, the traverse method can be employed. Suppose the point M is to be determined. Its direction from A or B is found and its distance is measured. It is then plotted on the map according to the scale in use.

The contours are drawn somewhat as follows: Suppose a point X is on a hill top. The topographer finds the altitude by the aneroid barometer or by measurement from a point whose altitude is known. He has

also determined the altitude of various other points. But he does most of the work by sketching in the contours. This sketching requires skill and a knack for the work. The accuracy of the sketching of course varies with the topographer. The above description is not an exact account, but

FIG. 3

The standing figure shows the method of taking levels; the other figure shows the method of getting the direction upon the map of different points.

it includes the fundamental operations and may make clearer the special method to be described.

The method used for class work is a rough imitation of that of the topographer. In order to give practice in expression, a portion of a campus was chosen which combines steep and gentle slopes. A sketch of the region that was mapped is shown in Fig. 4. The first thing to be decided was the scale and the contour interval. The dimensions of the

map were 6 by 5 inches and that of the area to be mapped, about 200 by 100 feet. The scale was fixed at 30 feet, or twelve paces to the inch, this being a convenient unit for the size of the map. The difference in height between the highest and lowest points is about 20 feet; the contour interval was taken at five feet, or, for convenience, the distance from the eye to the ground.

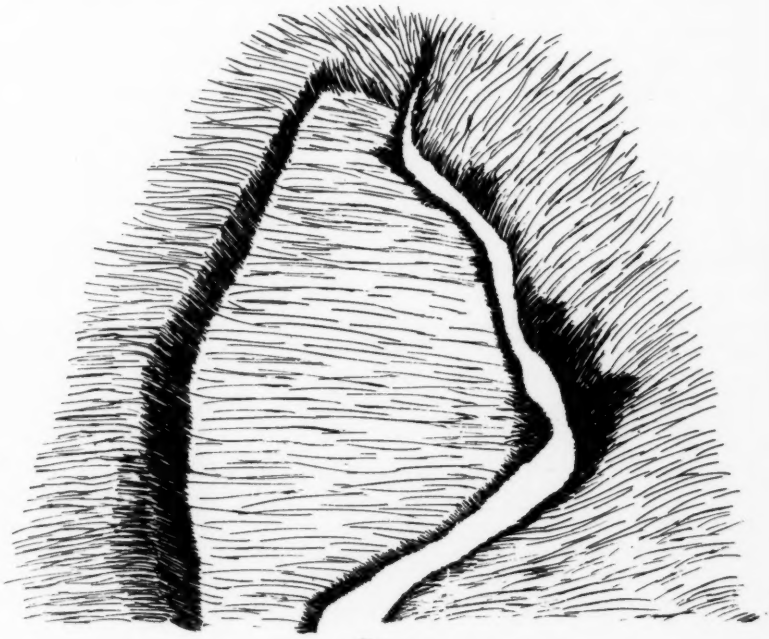

FIG. 4
A sketch of the area mapped.

The plane table was not used. The idea was to employ as simple apparatus as possible, both because such apparatus is easy to obtain and because the principle is much more easily grasped when simple apparatus is used. A drawing pad was placed on the ground and by means of a hand compass was oriented (Fig. 3), the top of the map being placed to the north. The base line A, B, Fig. 2, was drawn along a straight level path and was made thirty feet in length. This length was chosen because the level part of the path was about that long; it was represented on the map

by a line one inch long. Its direction was obtained by placing a ruler on the map and sighting to get the ruler in the direction of the path.

Having determined the base line and its representation on the map, the location of trees and other objects was an imitation of the topographer's traverse methods. The reading of angles, of course, was not attempted, and the intersection method was but little followed. To locate a tree, for example, one would pace from one end of the base line and determine its distance. Its direction of, say, northeast 10 degrees, could be found by the compass and the line plotted on the map, but with a small area there

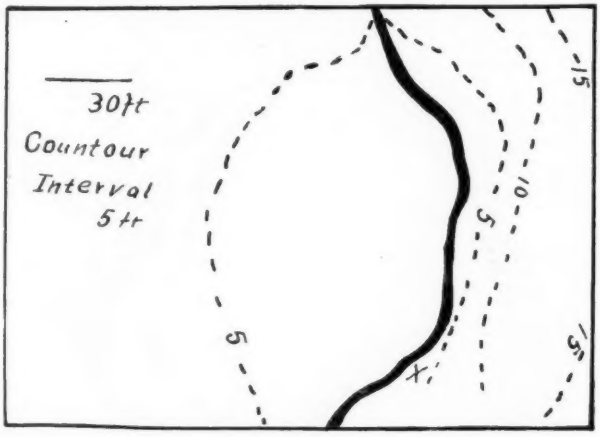

FIG. 5
A contour map of area sketched in Fig. 4.

was little error in sighting to the tree along the ruler on the map and assuming that the line along the ruler would coincide with a line determined by the compass, Fig. 3. For large objects it was found sufficiently accurate to take a protracter to one end of the base line, repeat the process at the other end, and then find the position of the object on the map by the intersection method. Fig. 2 shows the map on which intersections were made.

Having located a few points the contouring can be taken up. For simplicity the lowest part of the region is taken as zero; it is generally found in the water channel. The lowest spot shown on the map is marked X, Figs. 2 and 5 and from this point altitudes were measured. Standing at point X, obviously all points on a level with the eye would belong in

the first five foot contour line. The problem is to find the points in such a plane. Unless one has tried the experiment, it is difficult to realize how easy it is to under or over estimate altitudes. There are many ways in which this can be done with accuracy. For instance, if one should take a carpenter's level and holding it horizontal, look along it, all objects seen in the plane of the level would be in the same plane as the eye. This is the principle of the Locke level which is used for this purpose and which is more convenient.

However following the plan of using simple instruments, we employed a crude but simple method. If one looks across the level top of water in a glass tumbler, obviously it serves the purpose of the Locke level. The level may be ascertained since the water's edges on both sides of the glass are in the same plane. The chemist's "U" tubes serve the purpose well. The standing figure in Fig. 3, illustrates the method.

It is well for one person to act as "marker" by placing paper, stakes, etc., to mark the levels. Where the slope is small these may be some distance apart but where the slope is steep or the surface broken, the markers should be closer. If desirable, some of the markers can be located on the map, e. g., m-m Fig. 2, to guide in sketching. When a good idea of the location of the first contour is gained, the contour should be sketched upon the map. After the first contour is drawn, the process can be repeated by taking a point ten feet above the zero point, or five feet above the first contour, and repeating the process. The same procedure can, of course, be repeated for any contour.

In practice the two operations of locating objects and getting data for altitudes can be combined, especially after the first contour is drawn. They have been described separately for the sake of clearness. The work should be watched especially where the contours cross a valley for this seems to be a stumbling block in reading and drawing maps. The widening of the space between contours in gentle slopes and its narrowing on steep slopes were espcially valuable in giving an almost unconscious facility in understanding a map. The completed map looked something as in Figure 5.

After the field map was completed and corrected, a day was spent in map sketching. Some of the problems were: draw a deep valley with a steep slope; with gradual slope; a valley with a slope of 10 feet per mile. Draw a hill 50 feet high, contour interval 10 feet; draw the same with a valley on the N. W. side, 20 feet deep at the mouth; a hill with a slope of 10 feet to the mile on the east side and 20 feet on the west side. Place a smaller hill 20 feet high on the east side.

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TRAINING IN GEOGRAPHY[1]

By F. P. GULLIVER
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GEOGRAPHY has been taught for many years as an informational subject. Masses of facts are given, many of them undigested, and often these facts have no systematic relation to each other as they are given to the pupils to remember. Memory is made an all-important factor by this method of teaching the subject, and it is an undoubted fact that the memorizing of a mass of disconnected material is one of the most difficult accomplishments for the human mind, and one which is practically useless from an educational point of view. Most of the facts so learned are retained in the mind but a short time and are easily forgotten. This leads to the method of cramming for examination, which is always to be deplored.

Systematic training in the science of geography has demanded a good deal of attention during the past few years, and it is to this subject that attention is called in the following paper. The history of the development of systematic geography from the early work of Ritter and von Humboldt will not be discussed, but assuming the fact that geography may now be considered a distinct branch of science, some of the more recent methods of teaching this important subject will be described and discussed as a valuable means of training the minds of pupils.

No one will doubt that every educated man should know a certain number of the important facts in regard to the geography of the world in which he lives, and of which he is a part. The relation of man to his surroundings is too important a subject to be lightly passed over in this age of great commercial enterprise. The boys of to-day will have to be the leaders of the world to-morrow. No one can successfully cope with the world problems of trade and commerce unless he has some knowledge of the various portions of the world in which he is to become an important factor.

The difficulty lies in knowing just how to obtain this knowledge of the great world outside of one's own little sphere of activity. The ideal way of course would be to travel to all parts of the world, and see as minutely as one can the surroundings of other people in other climes, but of course this is possible for only a very few of us. The time necessary to obtain even a fairly accurate knowledge of the one hundred square miles im-

[1] Reprinted from *Elementary School Teacher*.

mediately surrounding one's home makes it absolutely prohibitive to study the geography of the world by this ideal method. It is astonishing to find how few people have any adequate conception of even twenty-five square miles of territory immediately surrounding their home.

The method used therefore in systematic geography must be such that with a minimum amount of actual travel, rational and intelligent ideas may be obtained of parts of the world which cannot be visited in person. Books of travel well written have always been interesting to boys, and it is undoubtedly true that a great deal of information in regard to other parts of the world comes from such books of travel. The writer firmly believes that many more such books of travel written particularly for young readers will be of the greatest value as aids in the teaching of geography. This, however, is work which should be done outside of the class as illustrative of class work rather than as the basis of systematic gography. The short stories written for children, such as have appeared in the last few years in the St. Nicholas, Youths' Companion, and other well written papers for children, stimulate in the very young the thirst for more knowledge in regard to distant regions. These truthful stories of differing conditions have very wisely taken the place of the fantastic tales which used to be told in regard to monsters, goblins, and extinct animals. What is wanted is actual knowledge of the present conditions in the world in which the boy is to live.

There is very wide acceptance of the idea that the point to begin the teaching of geography is the home and its surroundings, the school, the school yard, and the village, city, town, and county in which the pupils reside. Home geography, then, should undoubtedly be the starting-point for systematic training in geography. The great difficulty in the carrying out of this idea is the fact that no text-book is available for every school. In fact no publisher would consider the idea of making a separate text-book for each town. In a few of the great centers of population this has been attempted; and as far as the results of only a few years of application of this method warrant an opinion, it is undoubtedly true that this method has met with very great success.

A greater difficulty than the text-book is the teacher. Very few teachers are properly prepared to instruct their pupils in regard to home surroundings. The teachers themselves do not know the home in which they live; this is a strange fact, but very true. A good teacher in sympathy with the suroundings of the home and school can develop a great deal of interest among the pupils in home geography. Teachers are too often afraid

to rely entirely on themselves, and hesitate to start out as explorers with the class in the immediate vicinity of the school.

Principals and superintendents also are not alive to the real situation in this matter. They know that the teacher is untrained, and they fear the criticism of parents that "time is wasted when not spent looking at a book." The fact, however, remains that time is not wasted by out-of-door work, even if imperfectly done. It is far better to get a fair knowledge of one's surroundings on this earth than to have no knowledge whatever of one's surroundings. Observational knowledge remains in the mind much more tenaciously than facts learned from a book, and if the facts learned about the home are so learned that they lead the mind out into the greater affairs of the state, the country, and the world, it will be of infinitely greater value to the pupils individually, as well as to the state, the country, and the world in which these pupils live.

By a study of any industry located at home a knowledge of that industry, as carried on in other parts of the world, may be rationally and easily obtained. This study of some special branch of agriculture or manufacture leads to the wider study of commerce. The commercial relations of the world depend on the facts of home geography in a great number of points. It is along these lines of commercial enterprise that the life blood of the world flows. Until some reasonably accurate idea is obtained of the industries immediately surrounding one's home, it is practically impossible to give pupils any adequate conception of the great world industries, of which his home industry is simply one small part.

Geography deals with many of the complex interrelations between man and the plants and animals which surround him. It is therefore important that he should study first the plants and animals surrounding him before he can understand the great trade of the world in cotton and leather. A fairly accurate knowledge of the growth of the plants which surround him will enable the boy to form some rational conception of the growth of other plants in other parts of the world, which have an important relation to the life of man on the earth. A study of the habits and characteristics of the animals in any region will in a similar way enable the boy to conceive in a fairly accurate way the great facts in regard to many animals in different parts of the world, upon whose existence and development man so largely depends.

It may be safely said therefore that systematic training in geography should begin with the home surroundings; and that a knowledge of the relative location of the home to the school, the school to the village, the

village to the city, the railroad connections of county and state leads to the state capital, to the state metropolis, and should lead later to a knowledge of the other states, and finally to the other countries of the world. The next step should be a study of the plants and animals surrounding the school in order that the pupils may have a clear understanding of the great facts of animal and plant life which so closely affect the position of man on this globe.

No one will be bold enough to say that every school should take up systematic geography in exactly the same way. So much depends upon the locality, and so much on the individuality of the teacher, and upon the interest of both teacher and pupils, that the best scheme for each individual school must necessarily differ from the best scheme for other schools. There are however many important principles which should be studied in every school, and a text-book based on these general principles, written so as to stimulate observation rather than memory may be so constructed that it will be of service for schools in very widely differing localities. It must emphasize those facts of local geography which are characteristic of the greatest number of regions. These exercises must of course be supplemented in each individual locality by the facts which appeal most to the interests of the pupils and teacher.

Such a book should contain exercises based on the common animals and plants which occur in the greatest number of localities. When an exercise cannot be used in a given locality another more suited to that individual school should be substituted in its place. Thus after a few years of work in any given locality a teacher will find those subjects which best stimulate the observational faculty of each pupil. The text-book will not be used as a cast-iron structure from which no deviation can be made, but will become an elastic structure which will simply guide the minds of teacher and pupils into the lines of thought best calculated to give the pupils such an idea of the immediate surroundings, that they may then safely extend their conceptions to more distant regions.

For example, the study of meridians, that difficult stumbling block for so many pupils, should begin with the idea of the shadows at noon of various objects. These shadows form the mid-day line for the school. Let this idea of a mid-day line be extended until its significance is perfectly clear. At 12 o'clock the shadow of a pole forms the mid-day line for the school. Extend this mid-day line both north and south. When this conception is perfectly clear introduce the idea that by following this mid-day line north and south the north pole and the south pole will be reached. Then state the fact that this is the meridian line of the school.

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By the use of a small globe it will then be very easy to pass to the idea of the meridians of other places, and the false idea often obtained that meridians are only imaginary lines, drawn at stated intervals, east and west from Greenwich, will never enter the minds of the pupils. Mid-day lines are everywhere. Meridians in the same way pass through all points on the face of the earth. Their real character is thus firmly established in the minds of the pupils, and the mathematical fact that lines may be imagined between any two points does not enter into the conception at all. An actual meridian line should be drawn on the school room floor or in the school yard, from which pupils may take their first conception of a map.

Map drawing and map construction should be among the earliest ideas introduced to pupils. Before maps of the county, state, country, and world are introduced, pupils should know from actual experience what a map is. Make a map first of what may be seen, the school room, the school yard, or the village. Let this map be constructed on different scales, so that pupils may realize what the change of scale means, the representation on a small area of a larger area. One of the commonest sources of misconception in geography is the lack of appreciation of what a map really represents.

When pupils thoroughly understand the meridian and the school map, the idea of representing a larger area should be introduced. This may be called *a route map*. The class should cover an area so large that it cannot all be seen from one point. A compass may be used to give direction; pacing, revolutions of a wheel, or time taken on a trolley trip may be used for distance. The route followed on the trip should then be represented on different scales. More than one such route map will have to be made before all the class get a correct idea of what a map really means.

When the making of such a route map is impracticable a very good substitute is to take the courses followed by different pupils from their homes in different parts of the town to the school. When each one has made a map of his daily walk to and from school, these lines may be put together on the blackboard by the teacher or pupils, and the map of the village is thus easily obtained. The school in this map may be represented by a dot, while in the first map constructed it is represented by four lines surrounding the space which represents the interior of the school building. Only after these conceptions are fully fixed in the minds of the pupils is it safe to introduce a map which represents the village as a dot, with roads and railroads connecting surrounding towns, also represented by dots.

Along with the development of the idea of local geography a knowledge of what a village contains should be obtained by the pupils. The writer firmly believes that it is the wisest plan to introduce with this study of locational geography a knowledge of what makes up a town, its people, business, manufactures, its railroads, its steamship lines, as well as the plants and animals which inhabit the region.

Geography truly includes the elements of various sciences. If the elements of the various branches of science are introduced at this early period as a part of the teaching of geography, the pupils gain a better conception of what geography really is, and at the same time get a conception of what the other sciences treat. If the facts thus taught are wisely selected geography will not become a mass of disconnected facts, but will be a natural foundation for scientific training, and a stepping stone to the later study of the details of these other sciences.

EDITORIAL

IN RETROSPECT

THIS number of the JOURNAL OF GEOGRAPHY completes the tenth consecutive volume of an American Periodical devoted to the educational aspects of geography, and especially to school geography. The venture was inaugurated in January, 1897, by the present Editor, as the Journal of School Geography, and was continued for five years under that title. In 1902 the Journal of School Geography was combined with the *Bulletin of the American Bureau of Geography,* which had been for two years most successfully conducted by Professor Edward M. Lehnerts of Winona, Minn., and has since appeared under the present title. The change in title meant no change in scope or character, for it has always been the aim of the present editor and his colleagues to make the paper distinctly an educational paper. There have been for years strong scientific and popular geographic periodicals but these papers have given in the past and now give but little attention to the educational aspects of geography. That the venture was not ill timed has been proved by ten years of continuous growth and by the increase of favor with which the JOURNAL has been received. The publication of the JOURNAL has been "a labor of love" on the part of the several editors and publishers who have worked for its success. The JOURNAL has not met its expenses by a wide margin any year, and is still conducted at a large pecuniary loss by the present

Editor. The work has been carried on in spite of difficulties because the demand for the continuance of the JOURNAL was too great to be unheeded, as has been evidenced to the Editors very strongly in many ways. The continuance of the JOURNAL has been largely due to the contributions of friends of the cause who have helped frequently to meet expenses.

Ten years ago School Geography was just emerging from the darkness. The famous report of the Committee of Ten had aroused the leaders and the alive members of the ranks, and Frye's geographies had shown that there was a new and an interesting way of approaching the subject. During the ten years since school geography has been very much under discussion and vast strides forward have been made. New books, new methods, wider interest, more intelligent teaching, more rational use of maps, illustrations and supplementary work have largely taken the place of the old time memoriter work known in the years after the inspiration of Guyot had died out more or less and before the revolution inaugurated largely through the books of Mr. Frye. Now the discussion has waned a little, the leaders are more or less in accord as to ways, means and ends, and the promise of the future is bright. Geography in schools is destined to become even more rational and strong as the teachers continue to grow better and better able to interpret and apply the ideas of the leaders.

The growth, development and interest in the Secondary school, Normal and College fields have been no less important or keen. Laboratory work has come to stay in both secondary schools and colleges and it is now not the exceptional high school that teaches modern physiography; the leading colleges all have their departments devoted to geography or some phases thereof, and normal schools teach geography as a basis for methods of teaching.

The various stages of progress in this development all along the line have been chronicled in the JOURNAL and its predecessors noted above. A study of the files of these papers would form the basis for an interesting history of the growth of modern ideas and practices in this one phase of education. Not the least important of the advances has been the wider, saner and more human, not to say humane, interpretation given to the term geography by leaders and followers. Geography is no longer considered a synonym for physiography; it is viewed as a subject full of life as well as earth, and it is recognized that good pedagogy demands the teaching of geography in its broadest sense in schools.

The inspiration that has caused this growth and development all along the line has come largely from the leaders in the colleges who helped

organize and make available the results of scientific geography. Chief among these leaders is Professor Davis of Harvard University: who has taught a large number and been a constant inspiration to all teachers of geography in colleges, secondary schools, and normal schools. Professor Tarr of Cornell University, by his books and writings, is a close second among the earlier workers at the task of bettering educational geography. The names of the men and women whose good work is now known wherever modern geography is taught are too numerous to mention here. All have worked with enthusiasm, vigor and unremitting zeal in a cause that has proven large enough for a continuously increasing army of co-laborers. The names of Salisbury, Brigham, Goode, Gilbert, Frye, McMurry, King, Ward, Semple, Jefferson, Redway, Lehnerts, Clifford, Fenneman and Johnson are perhaps the best known and deserve the deepest thanks for their contributions to the cause.

More than a beginning has been made in the ten years which have elapsed since the inauguration of the Journal of School Geography. To this growth the JOURNAL has contributed what it could. It has chronicled events and new items as fully as possible, it has reviewed books frankly and impartially, it has published more papers on the teaching of geography than have appeared in any combination of sources known to the editor, it has done its best. The Editor appreciates keenly the shortcomings of the JOURNAL but he knows, as do few others, the difficulties with which the JOURNAL has been confronted, and recognizes that there have often been valid excuses for the deficiencies of the paper. What has been accomplished has been due to the constant help and encouragement of a few workers. Especially are thanks due to Professors Davis, Goode and Lehnerts, who have contributed so much to the success of the paper in many ways. A much increased subscription list is all that is now needed to make the JOURNAL enter upon its second decade with promise of increasing usefulness and strength. Friends of the JOURNAL can aid the cause of educational geography by helping in this work, and their assistance in this, as in all ways, will be more than welcomed by the Editor and his co-laborers.

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RECENT PUBLICATIONS

THE PRELIMINARY GEOGRAPHY, being volume I of the Oxford Geographies, by A. J. Herbertson, pp. viii and 149, Oxford. The Clarendon Press, 1906.

The Preliminary Geography is the first in the series of geographies by Dr. Herbertson, of which Vol. II, the Junior Geography, has already been reviewed in these columns. Planned practically as a beginners' book in regional geography, the volume contains a well-presented summary of the general and more important special features of world geography. Illustrated by numerous black and white maps and diagrams. These are the most unsatisfactory features of an otherwise pleasing book. Many are without scale. Most have no latitude or longitude lines and several are so reduced as to be almost unintelligible. Parts of the book would make excellent supplementary reading in elementary schools.

SYMPOSIUM ON GENERAL GEOGRAPHY. The Educational Bi-Monthly, Vol. I, No. 2, pp. 106-148. Chicago Normal School, December, 1906.

Contains articles on the Organization of the Subject of General Geography, by Frank W. Darling; the Physical Factor, by W. M. Davis; the Commercial Factor, by G. C. Chisholm, J. Paul Goode, Spencer Trotter; the Social Factor, by F. M. McMurry, A. J. Herbertson; the Political Factor by Richard E. Dodge, J. W. Redway; Geography in American Universities, by Jane Perry Cooke.

A valuable series of articles that deserve reading by all interested in school geography, and especially by teachers in elementary schools.

NOTES

NATURE NAMES IN AMERICA.—The early colonists, Puritan and Cavalier alike, were in the main English yeomen. They came not from the crowded centers, but from the rural districts, and it matters little from what district they came, all had been in touch with nature in England, and planted deep in their hearts was the love of fields and woods. This was not often expressed—it was too deep-seated a sentiment; but we see its workings in many an old chronicle. It was not what in the modern sense might be termed poetic, though there were undoubted poets among them. It was rather the feeling that an unlettered countryman has—a certain inexpressible love for the soil and the things thereof. The English emigrant to America was too much a part of his surroundings to see nature from the poet's point of view. The modern esthetic cult—the love of the beautiful—was not a portion of his mental equipment. He had the inquisitive and acquisitive qualities of mind, the interest in things for the sake of knowing about them, the attitude of the curious, and above all, an interest in the practical uses of natural products. With this attitude of mind toward nature he set foot upon the shores of the new world. The surroundings that he had left are best pictured in the rural

England of Shakespeare's and of Milton's time. The richly green meadow pastures watered by abundant streams, along the banks of which Walton and his brother anglers loved to loiter in the shade of broad-spreading trees; the rolling uplands and lines of low hills; the deeply ploughed fields and scattered masses of woodland, with here and there a church spire peeping above them; the hedge-rows blossoming with wild flowers and haunted by innumerable song birds; ancient, ivy-mantled towers and drowsy hamlets, with noisy flocks of rooks and daws—these were the elements in a landscape enveloped in the soft atmosphere of an English sky, and with all the endeared associations of home, that the emigrant carried in his mind and heart to America. Little wonder that he sought in his new surroundings for something to remind him of this old home. The forbidding, untrodden wilderness hemmed him in on every side. The Puritan found a rugged land and a harsh climate; the Cavalier, a more generous display of nature; but each had to wrest wide areas from the wilderness before the landscape could become in any sense domestic. As this domestication of the land went on, the colonists found birds coming about their dwellings, building nests in their gardens and in the shelter of their barns, and they began taking note of many of the wild plants that grew in their neighborhood. By the time some of the earlier accounts were written, the settlers had already made the acquaintance of a number of the more familiar kinds and had given them names. It was the England of Elizabeth that was transplanted in New England and Virginia, and a considerable body of old world folk-lore was a part of this transplanting, much of which has come down to us in the names of plants and in the various other forms of speech. Garden-craft and the 'art of simpling' was a part of every housewife's knowledge, and plants were diligently sought for their healing virtues. Knowledge of this kind was also to some extent gained from the Indian inhabitants. In all the earlier descriptions of the new world such objects had a prominent place, together with the character of the land and aboriginal peoples and the advantages for settlement. One can see in these accounts the evident striving of the European mind to find suitable names and to describe an object by its likeness to familiar objects at home.

The few records that we have of the impressions of the earlier colonists are scattered through old journals, letters and histories of travel, and the references to plants and animals are often exceedingly obscure as to the species indicated. The question of the origin of names is at best recondite. Names are part of the folk-lore of peoples; they came into existence far back in a dim past, long before the period of written history. When

we do find them gathered in ancient vocabularies, as in the one of Aelfric (955-1020 A.D.), we may be sure that they were even then venerable with age. The new world has added comparatively little to the stock of old world nomenclature. More often an old name has been given to an entirely different thing from the one that it originally stood for, and has been twisted into a new meaning with new associations. Thus the word *creek* originally meant the tidal estuary of a small river, a place where vessels might find harbor, and it so used throughout Great Britain to-day. In certain parts of the United States, notably along the middle and southern Atlantic seaboard, the word has been extended to the small tributary of a river throughout its entire course. In England these little inland streams are called 'brooks,' which is clearly their rightful name—shallow watercourses with much tumbling and bickering over stony places. Milton very clearly distinguishes between the two where in 'Paradise Regained'

Freshet or purling *brook,*

many be contrasted with the lines in 'Paradise Lost'

Forthwith the sounds and seas, each *creek* and bay,

Both are here pictured with their characteristic associations, the one as an upland stream, the other as a tidal inlet. In the Bible the word 'creek' is used with perfect clearness as to its meaning in the description of Paul's shipwreck—"And when it was day, they knew not the land: but they discovered a certain *creek* with a shore, into which they were minded, if it were possible, to thrust in the ship." Here we have the idea of a harbor in the use of the word. It is possible, I think, to see how our brooks have come to be called 'creeks' when we reflect that south of New England the large rivers have many smaller streams emptying into their tidal waters. The mouths of these are often deep enough to make a shelter for vessels, and they were undoubtedly so used by the early settlers. Hence the term 'creek' and its extension to the entire stream and to other similar streams far inland throughout a wide extent of country.

In portions of the middle Atlantic region the word 'cripple' was formerly used for dense, low-lying thickets, especially in wet ground. As a boy I occasionally heard it applied in this way, and it is quoted by Murray as occurring in the Penn-Logan Correspondence (1705). None of the dictionaries, however, attempt to trace it back to any dialectic source, nor is it given, with like meaning, in the vocabularies of provincial English. In the dialect of east England 'creeple' means to compress or

squeeze, which might suggest the notion of a thicket. But words were not coined by the early settlers through mere suggestion; they had an ample supply for every-day use. This word 'cripple,' from its very local character, is undoubtedly a corruption of the Dutch word 'Kreupelbosch,' signifying 'underwood,' the Anglicized form having been shortened by dropping the terminal 'bosch,' which means a wood or forest, and is allied to our now obsolete words, bosky and boscage. 'Kreupel is an adjective meaning lame and suggests a creeping or halting mode of progression as in the common use of the English word. One who toils painfully through thickets with much inward, if not outward, cursings will appreciate this most expressive word borrowed by our English settlers from their Dutch neighbors on the Hudson.

Swamp is more generally used in the United States than in England. It does not occur in the writings of either Shakespeare or Milton, though some of the minor poets make use of it and it is frequently found in the early descriptions of the colonies. The word implies wet, boggy ground in woods, with rank undergrowth, and is eminently characteristic of the wilder conditions of this country as compared with the more highly cultivated lands of Europe. The settlers, in this instance, had a keen sense of the fitness of the name. They early distinguished the treeless stretches of salt grass along the seacoast and river estuaries by the word *marsh*. *Fen* rarely if ever finds its way into American speech and writings, except when used in a poetical sense, as in Longfellow's 'fens of the Dismal Swamp.' *Swale* appears to have two meanings, a shady spot and a low rise of land. In provincial dialects it means both a vale and a shady place and in Northamptonshire 'a gentle rising in the ground.' In the western United States it refers to a boggy depression in a generally level stretch of country, and as a local word in New England it signifies an interval (intervale) or hollow, an umbrageous spot—the haunt of woodcock and other wild folk. *Valley* has replaced the older 'vale,' which now is found only in the poets' verse, and 'dale' has likewise suffered a decadence save in the northern countries of England. Both vale and dale, however, survive as the terminations of many place-names in England and the United States. Valleys seems to be equivalent to the lowland along a river's course, while vale and dale have to do with smaller streams, or more often with woodland hollows. In the following passage there is evidently this view in the writer's mind:

> The Land higher up the Rivers throughout the whole country, is generally a level Ground, with shallow Vallies, full of Streams and pleasant Springs of clear

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water, having interspers'd here and there among the large Levels, some small Hills, and extensive Vales. (Beverley's 'Virginia.')

In the south, and to some extent in the western states, the word 'branch' is widely used for brook. Beverley, in his account of Virginia, speaks of 'Gravelly Branches of Chrystal Streams.' *Freshet,* now synonymous with the overflow or flooding of a stream, was formerly used in the same sense as brook, as in the line of Milton above quoted. The term is said to be locally in use in Maryland to-day. Once when fishing along a small stream in southern Nova Scotia, a young lad who accompanied me remarked that it was 'most too low a freshet for good fishing.' This was a new meaning of the word to one who always had associated it with floods, but it was without doubt a survival, in a slightly altered form, of its original sense. The Anglo-Saxon *Fersc,* from which the modern English 'fresh' is derived, meant 'on the move,' and was originally applied to a 'running' or 'fresh' water. *Run,* synonymous with brook, is a survival in America of 'rine,' 'rindel' and 'runnel,' of old English dialects.—*Popular Science Monthly.*

THE IMPORTANCE OF MAPS.—Another minor educational ideal is is that all books involving movement from one geographical locality to another should have sketch maps attached to them. This principle applies especially to works of fiction, which reach a far wider public than is the case with serious books. When we re-read the Waverley Novels after reaching maturity, and with a knowledge of the positions and surroundings of the localities dealt with, we cannot avoid regret that our childish interest in each of them was not quickened and our knowledge insensibly increased by a simple sketch map on the frontispiece. This stimulating power of pictorial representation is perhaps most clearly demonstrated by a case in which the map was as imaginary as the text. How much of the interest of *Treasure Island* would have been lost but for the immortal map with which Robert Louis Stevenson enriched it! Stevenson, indeed, was deeply imbued with the geographical spirit, and in several books—I can particularly recall *Kidnapped*—produced real maps which greatly assist the young reader. Half a century ago, even history—ancient, mediæval and modern—was read in the best schools without any reference to maps, with the result that most of us had to endure the loss of time in re-reading, when grown up, a mass of works which we had literally, but not geographically, mastered in our youth.—*Scottish Geographical Magazine.*